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Study & Analysis of Safety Engineering in Building Construction

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Abstract: In building and civil engineering Code of Safety Regulations for Industrial Establishments,which was first issued by the International Labour Office in 1949. Some countries include quarrying intheir construction regulations, but for the purposes of this Code it is considered that quarrying is anextractive rather than a construction industry. It is stressed that considerable thought was given to thedifferences which exist in building and civil engineering practices throughout the world, and the needboth to improve poor practices and to establish good practices where none exist today. Special attentionwas also given to practical considerations relating to the establishment of certain recommendedprocedures

Keywords: Safety Engineering , Building Construction

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INTRODUCTION

The practical recommendations of this Code of Practice are intended for the use of all those, both in the public and in the private sectors, who have responsibility for safety and health in the building, civil engineering and public works industries. The Code is not intended to replace national laws or regulations or accepted standards. It has been drawn up with the object of providing guidance to those who may be engaged in the framing of provisions of this kind and, in particular, governmental or other public authorities, committees in civil engineering or public works establishments, and safety committees or management in related enterprises. Local circumstances and technical possibilities will determine how far it is practicable to follow its provisions. Furthermore, these provisions should be read in the context of conditions in the country proposing to use this information. In this regard, the needs of the developing countries have also been taken into consideration.

General Duties of Employers:

Employers should so provide and maintain buildings, plant, equipment and workplaces, and should so organize work, as to protect workers as far as practicable against risks of accidents and injuries to health. When acquiring machines, appliances, vehicles or other equipment, employers should ensure that they conform to any official safety regulations applying to them or, if there are none, that they are so designed or protected that they can be operated safely. Employers should provide such supervision 'as will ensure that as far as practicable workers perform their work in the best conditions of safety and health. Work that is done jointly by a number of persons and requires mutual understanding and co-operation for the avoidance of risks should be specially supervised by a competent person. Employers should only assign workers to employment for which they are suited by their age, sex, physique, state of health and skill.

General Duties of Workers:

Within the limits of their responsibilities, workers should do everything in their power to maintain their and their workmate's health and safety. Before beginning work, workers should examine their workplaces and the equipment that they are to use, and should forthwith report to their foreman or other competent superior any dangerous defect that they may discover in them. Workers should make proper use of all safeguards, safety devices and other appliances furnished for their protection or the protection of others. Except in an emergency, no worker, unless duly authorized, should interfere with, remove, alter, or displace any safety device or other appliance furnished for his protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injuries to health.

Employment of Young Persons under 18:

No person under 16 years of age should be employed in the construction industry except as permitted by the competent authority and in accordance with conditions prescribed by that authority. No person under 18 years of age should be employed on work that is particularly dangerous, or is liable to affect the safety or health of considerable numbers of workers, or requires mature judgment for its safe performance, such as the operation of power-driven machinery, cranes, driving tractors, handling flammable liquids in bulk, work with explosives, the operation of steam boilers, and work with toxic or corrosive substances.

Employment of women:

Women should be employed in accordance with the provisions of national laws and regulations, or if there are none, with provisions that should be enacted, concerning: work before and after childbirth; night work; lifting, carrying and moving loads; handling dangerous substances; and performing dangerous or unhealthy operations.

WORKPLACES

Housekeeping:

Loose materials which are not required for use should not be placed or left so as dangerously to obstruct. Workplaces and passageways. Equipment, tools and small objects should not be left lying about where they could cause an accident either by falling or causing a person to trip. Scrap, waste and rubbish should not be allowed to accumulate on the site. Workplaces and passageways that are slippery owing to ice, snow, oil or other causes should be cleaned up or strewn with sand, sawdust, ash or the like. Portable equipment should be returned after use to its designated storage place.

Fire Protection Fire-Extinguishing Equipment:

Places where workers are employed should, if necessary to prevent danger, be provided as far as practicable with: (a)Suitable and sufficient fire-extinguishing equipment; and (b) An adequate water supply at ample pressure. All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment. Persons trained to use the fire-extinguishing equipment should be readily available during all working periods. Fire-extinguishing equipment should be inspected at suitable intervals by a competent person and properly maintained. Access to fire-extinguishing equipment such as

hydrants, portable extinguishers and connections for hoses should be kept clear at all times. Fire-extinguishing equipment should be easily visible.

General provisions:

Suitable and sufficient scaffolds should be provided for workers for all work that cannot safely be done at a height from a ladder or by other means. A scaffold should only be constructed, taken down and substantially altered: under the direction of a competent and responsible person; and as far as practicable by competent persons.

Materials:

Sufficient material should be provided for and used in the construction of scaffolds. Timber used in the construction of scaffolds should be straight-grained, sound, and free from large knots, dry rot, worm holes and other dangerous defects. No rope that has been in contact with acids or other corrosive substances or is defective should be used on scaffolds.

Construction:

Scaffolds should be designed with a safety factor of four times their maximum load. Pole, ladder and similar scaffolds should be provided with safe means of access such as stairs, ladders, or ramps. Pole, ladder and similar scaffolds should be adequately braced. Pole, ladder and similar scaffolds which are not independent should be rigidly connected to the building at suitable vertical and horizontal distances. A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength. Working platforms. All scaffolds on which workers are employed should be provided with a sufficient number of working platforms. No part of a working platform should be supported by loose bricks, drain pipes, chimney pots or other loose or unsuitable material. No working platform should be supported by an eaves gutter, a balcony or its coping, a lightning conductor or other unsuitable parts of a building. No working platform should be used for working upon until its construction is completed and the necessary safeguards properly fixed. Whenever practicable, a platform should extend at least 60 cm (2ft) beyond the end of the wall of the building.

Suspended platforms:

The platforms of suspended scaffolds should be provided with guard-rails and toe-boards on all sides, except that: on the side facing the wall the guard-rail need not be at a height of more than 70 cm (2 ft 4 in) if the work does not allow of a greater height; the guard-rails and toe-boards should not be compulsory on the side facing the wall if the workers sit on the platform to work, but in such case the platform should be provided with cables, ropes or chains affording the workers a firm handhold and capable of holding any worker who may slip. The space between the wall and the platform should be as small as practicable except where workers sit on the platform during their work, in which case it should not exceed 45 cm (1 ft 6 in).

ERECTION OF PREFABRICATED PARTS

General provisions:

As far as practicable the safety of prefabricated parts should be ensured by appropriate means, such as provision and use of: ladders; gangways; fixed platforms; platforms, buckets, boatswain's chairs, etc. suspended from lifting appliances; safety belts and lifelines; and catch nets or catch platforms. Prefabricated parts should be so designed and made that they can be safely transported and erected. In addition to the conditions of stability of the part when erected, when necessary to prevent danger, the design should explicitly take into account: the conditions and methods of attachment in the operations of stripping, transport, storing and temporary support during erection; and methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on prefabricated parts.

CONCLUSION

This report documents the results of a quantitative study of the factors influencing the safety. An extensive literature survey and review, observation methods, and interviews of junior and senior engineers was performed to determine the factors critical to the quality of construction projects. A total of 15 different quality factors were identified and categorized into five groups as follows: owner and consultant related quality factors, project and design related quality factors, contractor and labour related quality factors, material and equipment related quality factors, external related quality factors. The exhibit of these groups of quality factors was accomplished utilizing the Ishikawa (fishbone) diagram since it is fit for showing factors, interrelations between various groups of variables, and outcomes following from the factors. Also, the data obtained from the respondents was quantified by using the RII method and the relative importance of quality factors was obtained thereby, demonstrating the ranking groups according to the importance of levels for quality of construction projects.

SUGGESTIONS

1) There is need to spread awareness on sites about Advantages and use of Personal Protective Equipment's.

2) Safety training programs should be arranged on sites.

3) Workmen compensation should be provided by contractor.

4) Materials should be stored properly on site as per type and quantity of material.

5) Safety helmets are necessary to use on site as per designation of worker.

6) Demolished material management should be done properly.

7) Avoid over crowing on site. i.e., unnecessary person disturbance should be avoided.

8) Drinking and drugs should be avoided on site while working.

9) Lunch and tea break should be fixed with its time and also time span.

10) Proper training about materials quantity and its use should be given before starting the work.

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